

Spokesman. C. Jacquot
Université Louis Pasteur
Centre de Recherches Nucléaires
67037 Strasbourg Cedex
FRANCE

ANGULAR CORRELATIONS STUDY IN PROTON-NUCLEI
^{400 To 500 GeV}
JETS AT ~~HIGH ENERGIES~~ USING EMULSION
TELESCOPES TECHNIQUES

EXPERIMENT PROPOSAL
TO ~~THE HADRON JET EXPERIMENT WORKSHOP~~
~~OF THE FERMILAB~~

C. JACQUOT, D. KARAMANOUKIAN, J.N. SUREN
CENTRE DE RECHERCHES NUCLEAIRES
STRASBOURG

R. SCHMITT
UNIVERSITE DE LYON

E. VILLAR, A. RUIZ, R. MIEMBO
UNIVERSITE DE SANTANDER
(ESPAGNE)

Proposal submitted 18 April, 1977,
following telephone call from C. Jacquot to L. Voyvodet.
HPS.

EXPERIMENT PROPOSAL

~~To the Hadron Jet Experiment Workshop of the FERMILAB~~

I - AIM OF THE PROPOSAL

The aim of this proposal is to study angular correlations between particles in high energy hadron jets. The corresponding analysis have already been made for nucleus-nucleus collisions at 2 GeV/n. (submitted to Nuclear Physics), ~~for pp at 400 GeV (emulsion) and pp at 200 GeV (NAL DATA), here enclosed report.~~

II - DETECTORS

The aim of the experimental arrangement is to obtain the highest possible accuracy in angular data. The ordinary emulsion technique is known to be limited in precision by distorsion phenomena. This experiment is based on the fact that if emulsion is flown on emulsion substrated glass, the grain layer which is in direct contact with the glass cannot be sensitive to distorsion.

We have developed a technique which is able to flow emulsion on both side of glass sheets. All measurements will consist in determining the impact of the tracks on both sides of the glass, so that one can consider the glass is the detector. All possible shrinkage and distorsions are eliminated.

III - DESCRIPTION OF THE EXPERIMENTAL ARRANGEMENT

Fig. 1 shows a telescope unit ready to be exposed to the beam. We ask to expose 10 telescopes with aluminium target

10	"	with lead target
10	"	with carbon target

IV - DESCRIPTION OF THE MEASUREMENT TECHNIQUE

The position of the track impact on the glass surfaces are measured on a "TRICO" (tri coordinate digitalized microscope) on line with computer and giving 15 digits per micron on each axis. If one star is considered, all track impacts on glass are measured on the glass surfaces.

- DESCRIPTION OF THE COMPUTER RECONSTRUCTION

Knowing the glass impacts on both surfaces, the computer, making a fit on similitude and translation transformations can separate the beam tracks (translation) from the star tracks (similitude) and the background (no translation, no similitude correspondances). The star center is found to be the crossing point of all measured track vectors.

VI - EXPECTED ACCURACY

The expected precision for the jet particles measurements for a given glass thickness of 400 μ and a grain diameter of 0.5 μ is about $\frac{0.5}{400} \approx 1$ miliradian. In reality, the 400 μ m must be replaced by the distance of the star centre to the last glass surface which is (glass + emulsion + 1/2 target thickness) about 620 μ m.

VII - BEAM REQUIREMENT

This experiment should be exposed at a proton beam of 400 to ~~1000~~⁵⁰⁰ GeV with a incoming total flux of 5.10^4 particles/cm² over an irradiated surface of $\times 5$ cm².

As described in point III, 30 telescopes are expected to be irradiated.

VIII - TIME DELAY

For the manufacturing of these telescopes and Post delay we need 6 weeks before the exposure date.

REMARKS

The technical results of these experiences, especially improvements of direction accuracy, may be useful for "neutrino" collaborations. We are able and ready to produce and develop similar telescopes for other laboratories.

